

# Analysis of Leukemia Incidence and Mortality Data for St. Charles County, Weldon Spring and Surrounding Areas December 2011 (Update to April 2005 Report)

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## Synopsis

The results of the *Analysis of Leukemia Incidence and Mortality Data for St. Charles County, Weldon Spring and Surrounding Areas, December 2011* show that residents of St. Charles County, Weldon Spring and the surrounding areas (referred to in the report as the 5-zip code area which includes the 63301, 63303, 63304, 63366, and 63376 ZIP codes) do not have a significantly higher risk of developing leukemia than residents living in other parts of the state of Missouri.

The study compared the actual number of leukemia cases in the area to the expected number of leukemia cases and found that the number of cases in the Weldon Spring area was similar to what was expected based on leukemia incidence rates throughout the state of Missouri (Table 2 updated). Furthermore, leukemia rates for the Weldon Spring area were similar to leukemia rates throughout the state of Missouri (Table A).

The leukemia death rates in the Weldon Spring area were also similar to leukemia death rates throughout Missouri (Table B). The actual number of leukemia deaths in the Weldon Spring area appears to be higher than expected (Table 4 updated), but this number is impacted by a wide variety of factors including access to and quality of health care, co-existing health conditions and infections. Therefore, death incidents do not reflect the environmental risk of developing a disease. Those data are included in this analysis only for the sake of consistency with previous such analyses which included study of those data.

## Background

In April 2005, the Missouri Department of Health and Senior Services studied the incidence and mortality of leukemia in St. Charles County; specifically, Weldon Spring and its surrounding area. This study was undertaken due to public concerns regarding adverse health effects from some hazardous waste in the Weldon Spring area. The public was especially concerned with the incidence of childhood leukemia. The 2005 report recommended that another study should be conducted with the year 2000 as the midpoint to compensate for the lack of ZIP code level population in the 2005 study.

## Updated Analysis

In this update, Tables 2 and 4 from the 2005 report were supplemented with additional years of incidence and death data. The year 2000 is now the midpoint of all years included in the analysis. Since more years of data were included in this analysis, we were able to calculate stable age-specific rates and direct age-adjusted rates for the five ZIP-code area (Tables A and B). This allows for direct comparisons of disease frequencies between the five ZIP-code area and statewide.

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The incidence of cases of leukemia is a measure of the risk of developing the disease. Based on the updated data, we found the number of leukemia incident cases in the five ZIP-code area is not significantly different from what would be expected, based on statewide leukemia incidence rates (Table 2 updated). In addition, Table A shows that the age-specific incidence rate during 1996-2004 is not significantly different from that found statewide. Thus, the risk of developing leukemia in the five ZIP-code area was not different from that in the State during 1996-2004.

The death rate measures the risk of dying from leukemia, which is affected by multiple factors, including access to and quality of health care, co-existing health conditions, infections, and other factors. In addition, someone who lived and was diagnosed with leukemia in another county and later moved to the five ZIP-code area would be counted as a leukemia death in the area of study. Therefore, death rates do not reflect the environmental risk of developing certain disease.

Based on updated data from the 5-zip code area, the total number of leukemia deaths and the total number of leukemia deaths in those age 65 and older appears to be significantly higher than expected (Table 4 updated) but the actual leukemia death rates in the 5-zip code area were not significantly different from the statewide leukemia death rates (Table B).

Based on this analysis, we have concluded that there is no increased environmental risk of developing leukemia in the five ZIP-code area during 1996-2004 over that of the entire state.

**Table 2 (Updated)**  
**Observed and Expected Numbers of Incident Cases of Leukemia by Age and Gender**  
**Residents of Zip Codes 63301, 63303, 63304, 63366, and 63376, Missouri 1996-2004**

Age	Female			Male			Total		
	Obs	Exp	Sig	Obs	Exp	Sig	Obs	Exp	Sig
0-14	10	9.3	No	15	13.2	No	25	22.5	No
15-44	14	14.5	No	17	18.8	No	31	33.3	No
45-64	21	25.3	No	39	37.2	No	60	62.5	No
65+	49	47.9	No	76	60.3	No	125	108.1	No
Total	94	96.9	No	147	129.5	No	241	226.4	No

Data Source: Missouri Cancer Registry

The expected numbers are based on the age-, sex-, and race-specific leukemia incidence rates in the State of Missouri.

Obs: Observed    Exp: Expected    Sig: Significantly different

**Table 4 (Updated)**  
**Observed and Expected Numbers of Leukemia Deaths by Age and Gender**  
**Residents of Zip Codes 63301, 63303, 63304, 63366 and 63376, Missouri 1996-2004**

Age	Female			Male			Total		
	Obs	Exp	Sig	Obs	Exp	Sig	Obs	Exp	Sig
0-14	2	2.7	No	6	3.3	No	8	6.0	No
15-44	11	9.3	No	12	11.2	No	23	20.5	No
45-64	20	18.5	No	27	26.3	No	47	44.8	No
65+	68	55.2	No	83	65.4	No	151	120.6	Yes
Total	101	85.6	No	128	106.2	No	229	191.8	Yes

Note that in the above table the number of observed deaths is affected by multiple factors, including access to and quality of health care, co-existing health conditions, infections, and other factors. The number of observed deaths does not reflect environmental risk for developing a specific disease.

Data Source: Missouri Death Records

The expected numbers are based on the age-, sex-, and race-specific leukemia mortality rates in the State of Missouri.

Obs: Observed    Exp: Expected    Sig: Significantly different

**Table A.**  
**Leukemia Incidence Rates in the Five ZIP-code area in St. Charles County (63301, 63303, 63304, 63366, and 63376) and the State of Missouri, 1996-2004**

Age	Five ZIP-code area			State of Missouri			Sig
	Number	Rate*	95% CI	Number	Rate*	95% CI	
0-14	25	4.5	2.7 - 6.3	425	4.0	3.6 - 4.4	No
15-44	31	2.9	1.9 - 4.0	684	3.2	2.9 - 3.4	No
45-64	60	12.5	9.4 - 15.7	1,526	13.6	12.9 - 14.2	No
65+	125	64.2	53.0 - 75.5	3,901	57.4	55.6 - 59.2	No
Overall*	241	13.2	11.5 - 14.8	6,536	12.5	12.2 - 12.8	No

\* Rate per 100,000

Data Source: Missouri Cancer Registry

The population from the 2000 census was used in the calculation of the rates in the five ZIP-code area and the state.

\*\* Overall rates were age-adjusted using the 2000 US Standard Population.

Sig: Significantly different between the rates in the five ZIP-code area and the state

**Table B.**  
**Leukemia mortality rates in the five ZIP-code area in St. Charles County (63301, 63303, 63304, 63366, and 63376) and the State of Missouri, 1996-2004**

Age	Five ZIP-code area			State of Missouri			Sig
	Number	Rate*	95% CI	Number	Rate*	95% CI	
0-44	31	1.3	0.9 - 1.8	537	1.2	1.1 - 1.2	No
45-64	47	6.8	4.9 - 8.7	1,116	6.9	6.5 - 7.3	No
65+	151	53.7	45.2 - 62.3	4,489	45.7	44.4 - 47.0	No
Overall**	229	9.2	8.0 - 10.4	6,142	8.1	7.9 - 8.3	No

Note that in the above table the mortality rates are affected by multiple factors, including access to and quality of health care, co-existing health conditions, infections, and other factors. The mortality rates do not reflect environmental risk for developing a specific disease.

\*Rate per 100,000

Data Source: Missouri Death Records

The population from the 2000 census was used in the calculation of the rates in the five ZIP-code area and the state.

\*\* Overall rates were age-adjusted using the 2000 US Standard Population.

Sig: Significantly different between the rates in the five ZIP-code area and the state